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EXTENDING THE AREA OF IRRIGATED WHEAT IN
CALIFORNIA FOR 1918.

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Irrigation has never been a large factor in wheat production in California. Grain growing as thus far practiced here is essentially an extensive operation in which irrigation ordinarily has little part. The last census showed less than 5 per cent of the wheat acreage of California as irrigated.

California cereals are raised chiefly in three main valleys—Sacramento, San Joaquin and Imperial. A personal canvass of the wheat situation under the irrigation projects of these, and also of Honey Lake and Shasta valleys by members of our division, made during the past two weeks, indicates that irrigation can be made a decided factor in the California wheat program for 1918 if the farmers under irrigation projects are so disposed.

Sacramento Valley offers a large opportunity for increasing the irrigated wheat acreage in 1918 but, generally speaking, the use of water on this crop in this valley has been proved to be of advantage only in years of less than normal rainfall. In the Durham and Chico sections low yields are even held by experienced growers to result more from too much rainfall than from too little, the exception to this being the late spring sowings followed by deficient seasonal precipitation. Outside of the upper east side portions of the valley, however, and the lower lands near the river that are in some cases used for wheat, irrigation has proved a distinct advantage when the rainfall is below normal, or is up to normal for the year but below it in the spring when drying north winds may materially check the yield, unless counteracted by rain or irrigation. If 1917-1918 should be a dry season the production on 100,000 acres of grain land under the six principal irrigation projects of the valley could be very materially increased by irrigation, but in many cases this would necessitate having enlargements or lateral extensions ready. Of these 100,000 acres, 30,000 acres, not counting land in summer fallow, are idle or only in pasture in 1917.

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Assuming that material extensions will not be made on the basis of wheat irrigation alone, the area under Sacramento Valley projects which it is practicable to consider available for irrigated wheat in 1918 if the season is a dry one is probably under 50,000 acres. There was no irrigated wheat under these projects in 1917 and less than 2,000 acres of irrigated barley and oats. While experiments at the University Farm at Davis have shown that when the seasonal moisture is below normal, one or two irrigations will increase the yield of wheat very materially—the increase in two dry seasons ranged from 265 to 440 per cent—the irrigation of more than a few thousand acres of wheat in Sacramento Valley in 1918 is not likely, except in a very dry season or through an active wheat irrigation campaign.

San Joaquin Valley, especially around Tulare Lake and in Kern County, grows the chief area of California irrigated wheat, the main irrigation projects reporting 57,500 acres in 1917 out of a total of 260,000 acres of irrigated grain under all of the main irrigation projects of the valley. While the northern San Joaquin Valley counties were formerly banner wheat producing areas, they seem no longer to be a large factor in California wheat production; and, although possibilities for an increase under irrigation in these northern counties in 1918 are good, careful inquiry indicates that only an active educational campaign will bring about sufficient increase to be of consequence. North of Fresno, however, there are at least 150,000 acres under San Joaquin Valley irrigation projects on which wheat can be grown and irrigated to the extent that the substitution of irrigated wheat for other annual crops is found wise. Of these 150,000 acres, at least one-sixth is now idle or is reported as not likely to be farmed by its present owners in 1918, due to labor, money or other shortage. Evidently, without a very active educational campaign in the counties north of Fresno, the largest increase in the San Joaquin Valley irrigated wheat acreage in 1918 will be in those sections now giving most attention to this crop—Kern County and the Tulare Lake region. These sections produced all but 600 of the 57,500 acres of irrigated wheat grown under the chief San Joaquin Valley irrigation projects in 1917. Furthermore, they report over 200,000 acres open to irrigated annual crops, including wheat, in 1918, and a probable increase in the irrigated wheat area next year of over 20,000 acres, or of about 40 per cent. Unfortunately, however, the section in which the largest increase for 1918 is locally forecasted, actual wheat yields tend to ebb and flow with the floods of Kings and Kern rivers as they rise, and evaporation and use lower the level of the surface of Tulare Lake. Local conditions—sometimes smut, sometimes rust, sometimes worn-out soil—vary the possibilities of increasing the irrigated

acreage of wheat in this valley, but even giving consideration to these, much can be accomplished if the necessity for it is brought home to those who are in a position to act. In some cases those in charge of the canal systems may be able to further the irrigation of wheat by so changing their winter canal-cleaning schedules as to make more water available in the early winter for irrigation prior to seeding. In Madera County a low rate for water up to March gives irrigators an opportunity to flood grain land at a low cost and such flooding should ordinarily make the crop if later rainfall is deficient.

Increase in the irrigated wheat acreage in Imperial Valley in 1918 will be almost entirely a matter of propaganda. Of 401,000 crop-acres irrigated in this valley in 1917, 76,000 acres were in barley and only 1,220 acres in wheat. The area under the ten mutual companies of the valley stated to be normally available for grain growing under irrigation in 1918 approximates 85,000 acres, which of course does not include in excess of 100,000 acres of land now in other annual crops than grain; nor does it include at least 10,000 acres of undeveloped land under Mutual Water Company No. 3. Yet without an active wheat campaign in the valley and in addition, unless a supply of satisfactory seed is made available, it is not likely that the irrigated wheat acreage there in 1918 will be large. Some in the valley are emphatically opposed to wheat growing there, previous failures due to rust and poor seed being fresh in mind. On the other hand, a number of farmers there believe in wheat and the growers of the 1,220 acres of irrigated wheat in 1917 report a satisfactory yield. Furthermore, experiments at the Imperial Valley experiment station of the University of California show a response to irrigation by wheat exceeding that by barley. Yields as high as 35 to 57 bushels per acre have been obtained with irrigated White Australian wheat at the Imperial experiment station and in consequence and after careful observations of the behavior of wheat under irrigation in this valley, those in charge have advised that on the better soil of the valley wheat is likely to be more profitable than barley. Conditions in Imperial Valley therefore seem ripe for a substantial increase in wheat production if deemed necessary to make up the state's allotted quota.

There is no good reason why under a normal water year, the entire increased wheat production called for from California by the national program could not be produced, if deemed desirable, under irrigation. Decision No. 4278 of the State Railroad Commission applying to water utilities and chapter 191, Session Laws of California, 1917, applying to mutual water companies, open the way for furnishing water for emergency use on wheat and other annual crops where previously this might

have been impracticable. Availability of fall or winter water for wheat irrigation under a number of our valley projects makes it possible to irrigate a large acreage, and thus furnish a considerable measure of insurance against spring drouth, if the landowners are so disposed. At least 100,000 acres of California land now lying idle or nearly so, or first to be ready for cultivation in 1918, will be open to irrigated wheat in 1918 except to the extent that local conditions not disclosed by our survey make wheat production impracticable or unwise. Some of this will probably not be farmed in 1918 unless purchasers or tenants are found. Certainly out of all the areas indicated, irrigation can very effectively aid the war wheat program for the coming year.

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